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COMPARISONS OF THE ACTUAL TIDES OF HOBSON'S BAY WITH THOSE PREDICTED FROM HARMONIC CONSTANTS

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In order to determine the errors to be expected when using the Tidal Predictions for Williamstown (Hobson's Bay) issued by the Liverpool Observatory and Tidal Institute for the Melbourne Harbor Trust Commissioners, comparisons were made of the times and heights of all high and low waters predicted for the year 1953 with the times and heights of the corresponding tides recorded by the self-registering tide gauge situated at the shore end of Ann Street Pier, Williamstown.

The comparisons appear in the following tables. The differences are believed to be due almost entirely to meteorological causes. Analyses of weather conditions and their related effects on the tides have not been made. It is estimated in a general way from experience during the last thirty years that in very hot or northerly and easterly weather the tides are lower than usual and occur earlier than predicted. The reverse occurs in stormy weather during westerly or southerly gales.

The entrance to Port Philip is a little less than two nautical miles wide, and the tidal area of Port Philip is about 725 square miles. Because the entrance is so narrow in relation to the area enclosed, the mean tidal range in Port Philip is only about 1 ft. 8 in., consequently the percentage divergence of the actual from the predicted tide produced by a wind of given velocity in Port Philip is much greater than it would be in an inlet of similar area in which the tidal range was, say, 20 ft.

The lowest high tide recorded was on 27 July 1923, a height of 5 in., and the highest low tide was on 30 November 1934, a height of 3 ft. $8\frac{3}{4}$ in., during a violent and prolonged storm (when the following high tide rose to 6 ft. 6 in.). In stormy weather the tide rises with a series of surges having a period of between one to two hours or less. The heights of these surges vary between 6 in. and 10 in.

References

Bradley, J. E., 1949. Tides of Hobson's Bay. *Proc. Roy. Soc. Vic.*, 56: 113-122.

TABLE 1

Frequency of Differences in Time between predicted Tides and those occurring at Williamstown (1953)

	HIGH WATER TIMES							LOW WATER TIMES						
	0 min. to 10 min.	10 min. to 20 min.	20 min. to 30 min.	30 min. to 60 min.	60 min. to 90 min.	Over 90 min.	Total number of Tides	0 min. to 10 min.	10 min. to 20 min.	20 min. to 30 min.	30 min. to 60 min.	60 min. to 90 min.	Over 90 min.	Total number of Tides
January ..	30	13	8	8	1	0	60	13	20	10	15	2	0	60
February ..	24	11	5	11	3	0	54	15	10	13	15	1	0	54
March	18	16	11	12	3	0	60	12	13	13	20	2	0	60
April	20	16	9	10	2	1	58	20	12	8	16	2	0	58
May	19	14	12	13	2	0	60	19	15	8	14	4	0	60
June	16	15	13	10	4	0	58	14	18	14	8	3	1	58
July	17	15	8	16	3	1	60	20	18	9	6	4	2	59
August ..	22	14	9	15	—	—	60	16	18	10	14	1	1	60
September ..	21	12	6	13	4	2	58	16	11	10	11	7	3	58
October ..	22	12	15	9	2	—	60	19	18	9	12	2	—	60
November ..	19	6	16	13	3	1	58	16	13	9	17	3	—	58
December ..	20	15	9	13	2	1	60	17	16	6	16	4	1	60
Total Tides for Year ..	248	159	121	143	29	6	706	197	182	119	164	35	8	705
Percentage of Whole ..	35·13	22·52	17·14	20·25	04·11	0·85	100	27·94	25·81	16·88	23·26	04·97	01·14	100

TABLE 2

Frequency of Differences in Height between predicted Tides and those occurring at Williamstown (1953)

	HIGH WATER HEIGHTS								LOW WATER HEIGHTS							
	0 in. to 3 in.	3 in. to 6 in.	6 in. to 12 in.	12 in. to 18 in.	18 in. to 24 in.	24 in. to 30 in.	Over 30 in.	Total number of Tides	0 in. to 3 in.	3 in. to 6 in.	6 in. to 12 in.	12 in. to 18 in.	18 in. to 24 in.	24 in. to 30 in.	Over 30 in.	Total number of Tides
January ..	36	22	2	—	—	—	—	60	45	13	2	—	—	—	—	60
February ..	34	6	10	4	—	—	—	54	36	10	8	—	—	—	—	54
March	32	17	11	—	—	—	—	60	36	15	8	1	—	—	—	60
April	17	14	21	6	—	—	—	58	20	12	23	3	—	—	—	58
May	28	14	11	5	1	1	—	60	27	15	12	3	3	—	—	60
June	21	13	11	8	5	—	—	58	22	13	12	6	5	—	—	58
July	22	12	14	11	1	—	—	60	20	16	12	9	2	—	—	59
August ..	16	24	16	4	—	—	—	60	21	24	13	2	—	—	—	60
September ..	20	9	22	5	2	—	—	58	22	14	15	6	1	—	—	58
October ..	21	22	14	2	1	—	—	60	32	19	7	2	—	—	—	60
November ..	20	8	25	4	1	—	—	58	20	12	22	4	—	—	—	58
December ..	14	18	23	3	2	—	—	60	22	24	12	2	—	—	—	60
Total for Year	281	179	180	52	13	1	—	706	323	187	146	38	11	—	—	705
Percentage of Whole ..	39·80	25·35	25·49	7·36	1·85	0·15	—	100	45·82	26·52	20·71	5·39	1·56	—	—	100